

REMARKS

Claims remaining in the present application are 1-33. The Applicants respectfully request reconsideration of the above captioned patent application in view of the remarks presented herein.

Allowable Matter Withdrawn

Applicants note that Claim 16 was indicated as allowable in the Office Actions of June 13, 2005 and November 28, 2005. In the present rejection, Claim 16 is rejected. Applicants respectfully note that MPEP § 706.04 indicates, "it is unusual to reject a previously allowed claim" and instructs the Examiner that "great care" is to "be exercised in authorizing such a rejection." Applicants regret that Claim 16 currently stands rejected.

35 U.S.C. § 102

Claims 15-18 stand rejected under 35 U.S.C. § 102(e) as allegedly being unpatentable over Pullen et al. (US 20050240844, "Pullen"). Applicants have carefully reviewed the cited reference and respectfully assert that embodiments in accordance with the present invention as recited in Claims 15-18 are patentable over Pullen.

Applicants respectfully assert that Pullen fails to teach or fairly suggest “a method of determining a junction temperature of an integrated circuit ... comprising measuring an ambient temperature in a region proximate to said integrated circuit” as recited by Claim 15.

While Pullen may teach a method of determining a junction temperature, the method taught by Pullen is very much different from that recited in Claim 1. As taught in [0069], the method of Pullen depends upon a “temperature indication generated by (a) thermal sense device on-board each IC” (emphasis added). Applicants respectfully assert that such a temperature measurement by the taught thermal sense device on-board each IC fails to teach or fairly suggest “measuring an ambient temperature in a region proximate to said integrated circuit” as recited by Claim 15.

For this reason, Applicants respectfully assert that Claim 15 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

In addition with respect to Claim 15, as taught by Pullen, the “temperature indication generated by (a) thermal sense device on-board each IC” is the only measurement made in the taught process [0069]. As Pullen teaches a process of determining a junction temperature that is limited to

taking on-chip measurements, Pullen fails to teach or fairly suggest the recited limitations of “measuring electrical power utilized by said integrated circuit” and “accessing a thermal resistance value for said integrated circuit” as recited by Claim 15.

For this additional reason, Applicants respectfully assert that Claim 15 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

Further with respect to Claim 15, Pullen teaches that on-IC thermal sense circuitry 108 “provides an indication proportional to or indicative of ... the junction temperature” [0030]. In this manner, Pullen teaches determining a junction temperature by direct measurement, rather than by measuring other parameters, as recited by Claim 15. In this manner, Pullen actually teaches away from embodiments of the present invention as recited by Claim 15.

For this further reason, Applicants respectfully assert that Claim 15 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

Applicants respectfully assert that Claims 16-18 overcome the rejections of record by virtue of their dependency, and respectfully solicit allowance of these Claims.

In addition with respect to Claim 16, Applicants respectfully assert that Pullen fails to teach or fairly suggest “wherein said determining (a junction temperature) comprises multiplying said thermal resistance value by said electrical power and adding said ambient temperature” as recited by Claim 16. As described in [0030], Pullen teaches a direct measurement of junction temperature. Thus Pullen actually teaches away from the recited calculation recited in Claim 16. While Pullen may teach an equation (Equation 1), Pullen nevertheless fails to teach measuring the parameters necessary to perform such a calculation.

For this additional reason, Applicants respectfully assert that Claim 16 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

In addition with respect to Claim 17, Applicants respectfully assert that Pullen fails to teach or fairly suggest “determining a junction temperature of an integrated circuit, said method comprising... measuring electrical power utilized by said integrated circuit... wherein said measuring electrical power

comprises measuring current to said integrated circuit” as recited by Claim 17. While Pullen may teach that power is dissipated from an IC [0094], Pullen fails to teach measuring such power. In addition, Pullen fails to teach “measuring current to said integrated circuit” as a means for measuring such power.

Furthermore, Pullen’s teaching of power consumption, limited as it is, is not taught as part of a method of determining a junction temperature, but rather it taught in association with a different embodiment, that of “determining burn-in time.” Therefore, even if, *arguendo*, Pullen did suggest measuring current to determine power consumption, such suggestion fails to anticipate the instant claim of determining a junction temperature, as recited by Claim 17.

For these additional reasons, Applicants respectfully assert that Claim 17 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

In addition with respect to Claim 18, Applicants respectfully assert that Pullen fails to teach or fairly suggest “said thermal resistance value is accessed from a computer usable media” as recited by Claim 18. Applicants respectfully assert that Pullen fails to teach or fairly suggest any use, including storage or

computation, of a thermal resistance value. In fact, the only use of the term in Pullen is to define a parameter in [0073].

For this additional reason, Applicants respectfully assert that Claim 18 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

35 U.S.C. § 103

Claims 1-14 and 19-23 stand rejected under 35 USC § 103(a) as being allegedly unpatentable over Ando (US 20040111231, "Ando") in view of Cohen et al. (US 20050088137, "Cohen"). Applicants have reviewed the cited references and respectfully assert that embodiments in accordance with the present invention as recited in Claims 1-14 and 19-23 are patentable over Ando in view of Cohen.

Applicants respectfully assert that the Cohen reference, filed on September 3, 2004, actually post dates the priority date of the present application, March 1, 2004. Consequently, Applicants respectfully assert that Cohen does not qualify as prior art under 35 USC § 103, and that therefore the rejection is improper.

For this reason, Applicants respectfully assert that Claims 1-14 and 19-23 overcome the rejections of record, and respectfully solicit allowance of these Claims.

Applicants recognize a claim of priority in Cohen to a provisional application. Applicants respectfully assert that if the rejection's intent was to base the rejection on material disclosed in the provisional application, then the rejection must cite the provisional application.

Notwithstanding the improper rejection, Applicants respectfully offer the following arguments.

With respect to Claim 1, Applicants respectfully assert that Ando actually teaches away from embodiments in accordance with the present invention that recite "adjusting a body bias voltage of said integrated circuit under test to achieve a desired junction temperature of said integrated circuit under test" as recited by Claim 1.

The rejection identifies a temperature monitor circuit calibration test as taught in Ando [0035] as teaching "measuring an ambient temperature associated with said integrated circuit under test;" as recited by Claim 1.

The test taught in Ando [0035] depends upon “the internal chip temperature (being) equal to the ambient temperature.” Ando seeks to equalize internal and external temperatures, and thereby to calibrate internal temperature measurements based on known external temperatures. If the internal temperature was manipulated by adjusting a body bias voltage as recited, the internal and external (ambient) temperatures would no longer match. Thus, “adjusting a body bias voltage of said integrated circuit under test to achieve a desired junction temperature of said integrated circuit under test” as recited by Claim 1 would be deleterious to Ando’s test.

For this reason, Applicants respectfully assert that Claim 1 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

In addition with respect to Claim 1, embodiments in accordance with the present invention as recited in Claim 1 recite a system for utilizing power consumption and ambient temperature as inputs to control junction temperature. As recited by Claim 1, power consumption is a controlling input. In contrast, as taught by Ando, power consumption is a controlled output: “the power used by a circuit block can be controlled by controlling its supply voltage” [0022, emphasis added]. Applicants respectfully assert that one of ordinary skill in the art would understand a fundamental difference between the taught controlling power consumption and the recited controlling junction temperature.

Consequently, Ando teaches away from embodiments of the present invention that recite power consumption as a controlling input as recited by Claim 1.

For this additional reason, Applicants respectfully assert that Claim 1 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

With respect to Claim 1, the rejection concedes that Ando “does not mention expressly... said desired operation condition is a desired junction temperature.” Applicants respectfully assert that Cohen fails to correct this deficiency of Ando.

Applicants respectfully assert that Cohen fails to teach “adjusting a body bias voltage of said integrated circuit under test to achieve a desired junction temperature of said integrated circuit under test” as recited by Claim 1. In contrast, Cohen teaches adjusting frequency and power supply voltage (Figure 1, [0017], [0020], *inter alia*. Cohen is silent as to adjusting a body bias voltage. It is appreciated that the taught power supply voltage does not teach or fairly suggest the recited body bias voltage, as the two voltages are fundamentally different.

For this reason, Applicants respectfully assert that Claim 1 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

Further with respect to Claim 1, Applicants respectfully assert that Cohen fails to teach a method to “achieve a desired junction temperature of said integrated circuit under test” as recited by Claim 1. In contrast, Cohen teaches a method “to determine how fast to allow the microprocessor to operate for a subsequent time period” [0017]. As taught by Cohen, junction temperature is an input to this method; however, junction temperature is not controlled by this method.

For this further reason, Applicants respectfully assert that Claim 1 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

Claims 8 and 27 stand rejected with the same arguments presented with respect to Claim 1. Applicants respectfully assert that Claims 8 and 27 overcome the rejections for at least the rationale previously presented with respect to Claim 1.

Applicants respectfully assert that Claims 2-7, 9-14 and 28-33 overcome the rejections of record by virtue of their dependency, and respectfully solicit allowance of these Claims.

In addition with respect to Claim 4, Applicants respectfully assert that Ando in view of Cohen fails to teach or fairly suggest the limitation, “measuring power comprises measuring current to said integrated circuit under test” as recited by Claim 4. The rejection concedes that Ando does not mention this limitation expressly.

In ascribing such teaching to Cohen, the rejection cites section [0017]. Applicants respectfully assert that the term “current” as used in section [0017] refers to “the present time,” rather than to an electrical current, as recited in the instant Claim. The rejection also cites section [0021] as allegedly teaching the instant limitation. Applicants respectfully assert that the term “current” as used in section [0017] refers to “thermal current” as taught, rather than to an electrical current, as recited in the instant Claim.

Furthermore, Cohen teaches determining power by “voltage squared times the frequency” [0022]. By teaching determining power without measuring current, Cohen fails to suggest the limitation “measuring power comprises

measuring current to said integrated circuit under test” as recited by Claim 4, and fails to correct the deficiency of Ando.

For this additional reason, Applicants respectfully assert that Claim 4 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

In addition with respect to Claim 5, Applicants respectfully assert that Ando in view of Cohen fails to teach or fairly suggest “an operating voltage of said integrated circuit under test remains fixed during said measuring and said adjusting” as recited by Claim 5. The rejection alleges that this limitation is suggested by Ando [0033]. Applicants respectfully traverse. Applicants respectfully assert that this portion of Ando teaches “both circuits are for body bias.” Applicants respectfully assert that body biasing voltages fail to suggest operating voltage, as the two voltages are fundamentally different. In addition, within this section the term “fixed” is applied to a circuit topology, in contrast to the recited “fixed voltage.” Furthermore, this portion actually teaches adjusting voltages “to a desired value by the programmable select circuit,” in contrast to the recited “fixed” voltage. Thus, this portion, as well as the whole of Ando fails to teach or fairly suggest this recited limitation.

Cohen is not alleged to correct this deficiency of Ando, and Applicants respectfully assert that it does not.

For this additional reason, Applicants respectfully assert that Claim 5 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

Applicants respectfully assert that Claim 19 overcomes the rejections of record for at least the rationale previously presented with respect to Claim 1, and respectfully solicit allowance of this Claim.

In addition with respect to Claim 19, Applicants respectfully assert that Ando in view of Cohen fails to teach or fairly suggest “reducing temperature variation among an integrated circuit during burn-in testing” as recited by Claim 19. Both Ando and Cohen are silent as to the recited burn-in testing, and thus cannot contain teachings directed to burn-in testing. Furthermore, neither Ando nor Cohen, alone or in combination, teach anything related to “reducing temperature variation” as recited by the instant claim. Even if, *arguendo*, Ando and/or Cohen teach controlling temperature, these references remain silent as to “reducing temperature variation.”

For these additional reasons, Applicants respectfully assert that Claim 19 overcomes the rejections of record, and respectfully solicit allowance of this Claim.

Applicants respectfully assert that Claims 20-27 overcome the rejections of record by virtue of their dependency, and respectfully solicit allowance of these Claims.

CONCLUSION


Claims remaining in the present application are 1-33. The Applicants respectfully request reconsideration of the above captioned patent application in view of the remarks presented herein.

The Examiner is invited to contact Applicants' undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Please charge any additional fees or apply any credits to our PTO deposit account number: 23-0085.

Respectfully submitted,
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